

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2004/012672

International filing date (day/month/year)
26.08.2004

Priority date (day/month/year)
01.09.2003

International Patent Classification (IPC) or both national classification and IPC
G06F17/60, G06F17/50, G05B19/18, H05K13/04

Applicant

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

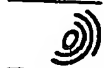
If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Sohrt, W

Telephone No. +49 89 2399-7185



WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

WV 568965

International application No.
PCT/JP2004/012672

IAP20 Rec'd PCT/PTO 21 FEB 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43bis.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

WRITTEN OPINION OF THE
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Box No. III Non-establishment of opinion with regard to novelty, inventive step and Industrial
applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 15

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the whole application or for said claims Nos. 15

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☒ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☐ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-14,16

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-14,16
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-14,16
Industrial applicability (IA)	Yes: Claims	1-14,16
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item III.

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

Claim 15 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined.

Claim 15 claims a mounter, but the features of claim 15 are regarding the mounting order the mounter receives, i.e. the mounter of claim 15 cannot be decided from a conventional mounter.

The question of whether the claimed invention appears to be novel, to involve an inventive step, or to be industrially applicable has not been and will not be the subject of the international preliminary examination in respect of the claims which have not been searched (Art. 17(2)(a) or (3) and Rule 66.1(e) PC, see also international search report).

Re Item IV.

Lack of unity of invention

The separate inventions/groups of inventions are:

1-2,13,14,16

Optimizing an order of component mounting for a plurality of mounters via identical sub-board patterns; optimizing the order of component mounting for any one pattern

3-10

Adding a number determination step for the number of patterns to be allocated to each mounter

11-12

Optimization by making distances uniform

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

Claim 1 is not inventive over prior art document D1, as explained in 2.1 below. The additional features of each claim of group 1 do not form an inventive general concept with any claim from group 2 or group 3.

Since the applicant has paid further fees for groups 2 and 3, all groups will be treated below.

Re Item V.

1 Reference is made to the following documents:

D1: EP-A-1 227 711 (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD) 31 July 2002 (2002-07-31)

2 INVENTIVE STEP GROUP 1

2.1 The solution proposed in claim 1 of the present application does not involve an inventive step (Article 33(3) PCT) for the following reasons:

Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parentheses applying to this document):

- An optimization method for optimizing an order of component mounting in a component mounting system having a plurality of placement heads for mounting components on a board

(§[0084] " In this improved step repeat method, the order of mounting of electronic

components is similar to that of the conventional step repeat method as shown in Fig. 7, where the mounting is carried out in the order of chip components -> SOPS -> QFPs as shown by arrows in Fig. 7. More specifically, as placement steps are shown sequentially in Fig. 8, the first steps include sucking up the chip component C1 to the first placement head 38a, the chip component C5 to the second placement head 38b, and the chip component C9 to the third placement head 38c by S-size suction nozzles, respectively, all simultaneously or each individually, moving the transfer head 28, and placing the chip components C1, C5, C9 onto the respective sub-boards in this order"),

- wherein a plurality of patterns having the same component placement structure is included in the board, said plurality of patterns corresponding respectively to a plurality of sub-boards obtained by partitioning said board

(§[0056] "Fig. 7 is a view showing an order of placement by an improved step repeat method in an example of a multiple board composed of three sub-boards having an identical pattern"),

and

- the optimization method comprises an allocation step of allocating each of the plurality of patterns to any of the plurality of placement heads for component mounting (§[0084] same passage as above; Fig. 8).

The difference of claim 1 over the teaching of D1 is that

- where D1 disclosing having multiple "placement heads", claim 1 talks about multiple "mounters" instead.

However, to a skilled person it is known that "multiple mounters" is a general term encompassing independently moving mounters as well as multiple mounters that are fixed relatively to each other and operate with synchronous movement, such as "placement heads" in D1.

Therefore, choosing "multiple mounters" instead of "placement heads" is a choice among obvious design options that a skilled person would take upon circumstances, thus arriving at a solution as set out in claim 1 without using inventive activity. Choosing one option over the other does not achieve any surprising technical effect.

- 2.2 Dependent claim 2 is not considered inventive (Article 33(3) PCT) because optimizing the order of component mounting for any one pattern among the plurality of patterns is implied by D1 (same passage of §[0084] as cited above).

- 2.3 Independent claims 13, 14, and 16 are not considered inventive (Article 33(3) PCT) for the same reason as claim 1.

3 INVENTIVE STEP GROUP 2

- 3.1 Dependent claims 3-6 are not considered inventive (Article 33(3) PCT) for the following reason:

A skilled person, implementing the system described in 1.1 above for the common case that there are more patterns than mounters, would have to distribute the patterns to the mounters in an efficient way.

- It is obvious that the patterns should be distributed as evenly as possible to the mounters in order to achieve a balanced load. Therefore, claim 3 is not inventive.

If there are remaining patterns after distributing an equal number of patterns to each mounter as far as possible, there are two choices what to do with them:

- either distributing the remaining patterns to one mounter each, thus arriving at the solution of claim 4,
- or splitting up the remaining patterns into sub-structures that are to be treated by the mounters individually, thus arriving at the solution of claims 5 and 6.

- 3.2 Claim 7 is not considered inventive (Article 33(3) PCT) because it is obvious that said sub-structures of 3.1 should be distributed in a load-balancing way to the mounters, i.e. that the mounting times are approximately equal.
- 3.3 Claim 8 is not considered inventive (Article 33(3) PCT) because a skilled person would avoid placing patterns such that they cannot be reached by any of the plurality of mounters; i.e. patterns would always be placed at "positions in the board on which components can be mounted by said plurality of mounters"

N.B.:

Possibly the wording "on which components can be mounted by said plurality of mounters" was meant to be "on which components can be mounted by *each of* said plurality of mounters"?

4. INVENTIVE STEP GROUP 3

- 4.1 Claims 11 and 12 are not considered inventive (Article 33(3) PCT) because when implementing the "simultaneously" moving mounting heads of D1 (§[0084]), uniform distances from default positions to the patterns and from placement positions to the placement positions are a logical consequence.

